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Impact of Oral Health Conditions on the Quality of Life of Preschool Aged Children

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ABSTRACT

Objective: To evaluate the impact of common oral health conditions and their treatment experiences on the quality of life (QoL) of young children and their parents/caregivers.

Methods: A prospective interventional study was carried out on children aged 2-5 years and their parents/caregivers in two hospitals in Lagos. Information about the impact of oral health on the children's QoL was obtained from parents/caregivers by means of interviewer administered Early Childhood Oral Health Impact Scale (ECOHIS) questionnaire. Data was analyzed using IBM SPSS version 20. All comparisons of paired measurements (pre and post) were based on the paired t-test statistics.

Results: A total of 208 children participated in the study. One hundred and eighty-eight (90.4%) parents/caregivers reported one form of impact on their children's oral health related QoL. Acute herpetic gingivostomatitis and chronic marginal gingivitis had the greatest and the least negative impact respectively, on the QoL of children. There was a reduction in the subjects' total ECOHIS scores after treatment of their oral conditions.

Conclusion: Oral health conditions had negative impacts on the QoL of preschool aged children and their parents/caregiver. Acute herpetic gingivostomatitis had more negative impact on the children's QoL than chronic marginal gingivitis. There was significant improvement in the oral health related QoL of the children and their parents/caregiver after dental treatment.

Key words: Oral health conditions, preschool aged children, ECOHIS, Quality of Life

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INTRODUCTION

Oral health conditions may cause considerable pain and discomfort, which affects what people eat and drink, hence their QoL and social well-being.¹ Though pre-school children encounter many oral health problems, many studies^{2,3} selectively assessed the impact of only one or two oral conditions on their QoL. Parents/caregivers or health caregiver may have an optimistic view of the child's QoL after dental treatment. However, a clear improvement may only follow over a period of time.

This study therefore evaluated the impact of common oral health conditions and their treatment on the QoL of preschoolers and their parents/caregivers using ECOHIS.

MATERIALS AND METHODS

This was a prospective interventional study carried out on children aged 2-5 years and their parents using a slightly modified English version of the Early Childhood Oral Health Impact Scale (ECOHIS). It is an oral health measure specifically developed to assess the impact of oral health problems in preschool aged children and their families.⁴⁻⁷ It is composed of 13 items distributed between two sections: the Child Impact Section (CIS) and Family Impact Section (FIS). The CIS has four subscales: child symptom, child function, child psychology and child self-image and social interaction. The FIS has two subscales: parental distress and family function. The scale has five rating response options to assess how often an event has occurred in the life of the child: 0 = never; 1 = hardly ever; 2 = occasionally; 3 = often; 4 = very often; 5 = don't know. ECOHIS scores are calculated as a simple sum of the response codes for the CIS and FIS after recoding the "I don't Know" responses as "missing". CIS and FIS ECOHIS scores range from 0 to 36 and 0 to 16, respectively, for which higher scores indicate a greater oral health impact and poorer oral health related quality of life (OHRQoL) and vice-versa. Detailed information and explanations of the study were given to each

subject and his/her parent or caregiver by trained personnel. (The caregiver in this concept is any accompanying adult who had provided any form of physical and/or emotional care for the child at home for at least 3 months). Written informed consent and assent were obtained from the parents/caregivers and children respectively before inclusion in the study.

Data collection procedure

Subjects with one or more oral health condition and their parents/caregivers were recruited consecutively as they came until the sample size was attained. Information about the socio-demographic characteristics of the participants was obtained. The patient's complaints and history were recorded and examination and clinical diagnosis made using recommended criteria.⁸⁻¹² Just before the commencement of treatment, the ECOHIS questionnaire was administered to the parents/caregivers. Subsequently treatment was instituted by the investigator and a review appointment was given to patients at 2 weeks and at 4 weeks post treatment.¹³ These appointments were enhanced by phone calls to the parents a week before appointment and a day prior to the appointment. On the second and fourth week review appointment days, the same questionnaire modified by rephrasing the lead-in questions by adding ("since your child completed his/her dental treatment, how often.....") was administered to capture the impact of treatment on the oral health related quality of life of the children and their parents.

Data Analysis

Data entry and analysis were done using the IBM SPSS Package for the Social Sciences version 20 with a power of 90% and level of significance of > 0.05. For each child-family pair, a total ECOHIS score was determined by simply summing the response codes for the 13 standard questions. ECOHIS scores for the Child impact sections were computed as a summation of the response codes from questions in that section. ECOHIS scores for the family section were similarly determined. Descriptive measures of location and of variability were determined for quantitative variables such as age, oral health-related quality of life scores, etc. All comparisons of paired measurements (pre and post) were based on the paired t-test statistic. Socioeconomic status of each child's family was determined by father's occupation and mother's education as earlier validated by Olusanya et al.¹⁴ and classified into social class 1 to 5 with class "I and II" being high socio-economic class and "IV and V", the low socio-economic class. The Analysis Of Variance Approach was adopted to examine variations in mean ECOHIS scores by

socio-economic status of parents.

RESULTS

A total of 208 subjects' data were analyzed. Overall, 48.1% were males while 51.9% were females; with a male to female ratio of 1:1.1. Majority of the caregivers were mothers (75.5%) from diverse ethnic background. (Table 1)

The socio-economic status shows that more than half (56.2%) of the parents belonged to the high socio-economic group. There was a significant difference between ECOHIS scores of children from low, medium and high socio-economic status using Analysis of Variance Approach (ANOVA) in examining variations in mean ECOHIS score by socio-economic status (P=0.007) (Table 1).

Table 1: Sociodemographic characteristics of the participants

	Frequency (n)	Percent (%)
Age (years) of children		
2	17	8.2
3	38	18.3
4	52	25.0
5	101	48.5
Gender of children		
Male	100	48.1
Female	108	51.9
Marital status of parents/caregivers		
Married	182	87.5
Single	14	6.7
Separated	12	5.8
Tribe		
Yoruba	106	51.0
Ibo	77	37.0
Hausa	5	2.4
Others	20	9.6
*Socioeconomic status		
High	117	56.2
Middle	35	16.9
Low	56	26.9
Total	208	100.0

*(P=0.007) using Analysis of Variance Approach (ANOVA) in examining variations in mean ECOHIS score by socio-economic status.

Some children presented with more than one oral condition. Overall a total of 229 oral conditions were diagnosed. Of these, 115 children had carious lesions on 133 teeth, of which 79 (59.4%) were sequelae of dental caries (reversible pulpitis, irreversible pulpitis, apical periodontitis, periapical abscess and dentoalveolar abscess). There were 35(15.3%) dental trauma related conditions (concussion, subluxation, lateral luxation, intrusion, extrusion, avulsion, laceration,

fracture). Twenty-seven had different types of gingivitis (chronic marginal gingivitis 22 (9.6%), localized gingival inflammations 5 (2.2%)). Seven (3.1%) had tooth discolorations (resulting from iron containing medications, tetracycline and food), eight (3.5%) had acute herpetic gingivostomatitis (AHG), two (0.9%) had halitosis and seventeen (7.4%) had disturbances related to either eruption or exfoliation (painful exfoliation with tooth mobility, ectopic eruption) (Table 2).

Table 2: Presenting oral conditions among the children

UčLŸŸ¹ ð	Frequency (n)	Percent (%)
AHGS	8	3.5
Lip laceration	2	0.9
Tongue laceration	1	0.4
Tooth fracture	7	3.1
Concussion	4	1.7
Subluxation	6	2.6
Lateral luxation	2	0.9
Intrusive luxation	6	2.6
Extrusive luxation	1	0.4
Avulsion	6	2.6
Dental caries	54	23.6
Reversible pulpitis	18	7.9
Irreversible pulpitis	17	7.4
Apical periodontitis	24	10.5
Periapical abscess	5	2.2
Dentoalveolar abscess	15	6.5
Generalised CMG	22	9.6
LGI	5	2.2
EED	17	7.4
Tooth discoloration	7	3.1
Halitosis	2	0.9
Total	229*	100.0

AHGS=Acute herpetic gingivostomatitis, CMG=Chronic marginal gingivitis, LGI= Localised gingival inflammation
EED=Exfoliation/eruption disorders

*Some of the participants presented with more than one oral conditions making the total number of oral conditions diagnosed higher than the total number of participants.

ECOHIS scores / impact of oral conditions on quality of life

At presentation, items related to "pain" and "difficulty in eating food" were reported most frequently on the child impact section while "feeling upset" and "feeling guilty" were reported frequently on the family impact section of the ECOHIS. Majority (90.6% and 91.4%) of the participants did not report any impact on smiling or talking respectively as a result of the oral health conditions (Table 3).

In this study, 90.4% of the participants had at least

an impact on their QoL in relation to their oral health. The maximum total ECOHIS scores were 30, 10 and 9 before intervention, at 2 weeks and at 4 weeks after intervention respectively.

Using the mean ECOHIS score, acute herpetic gingivostomatitis had the greatest negative impact on the quality of life of the participants while chronic marginal gingivitis had the least negative impact (20.80 and 2.54 respectively) (Figure 1). There was also significant difference between the mean ECOHIS scores of children with Acute Herpetic Gingivostomatitis and other forms of gingivitis ($p = 0.001$). Parents/caregivers reported more child impacts (mean=6.74) than family impact (mean=3.97).

Several treatment modalities were offered for these conditions, the most frequent was extraction (29.7%) followed by Glass Ionomer Cement restorations (14.8%) while the least was surgical extraction (0.4%). Others (55.1%) included pulp therapy, scaling and polishing, fluoride therapy, composite and amalgam restorations.

The mean ECOHIS score for each domain indicate that the children had more impact on the child function domain (2.94) than on the child symptom domain (1.79) and had the least impact on self-image/social interaction domain (0.38). Parents/care-givers had more impact on the family distress (2.21) than on family function (1.76) domain (Table 4).

There was a dramatic decline in the mean ECOHIS scores after intervention with a larger difference in the mean ECOHIS scores between pre-intervention and two weeks post intervention than between two weeks and four weeks post-intervention. There was also an appreciable mean difference between mean scores before intervention and mean scores at four weeks after intervention. These differences in mean between pre-intervention and two weeks post-intervention and between two weeks post intervention and four weeks post intervention were all statistically significant ($P < 0.001$) (Figure 2).

Table 3: ECOHIS response among participants before treatment

Impact	Never	Hardly ever	Occasionally	Often	Very Often	Don't know
Child impacts						
Oral/dental pain	50(24.0)	8(3.8)	95(45.7)	45(21.6)	10(4.8)	0(0.0)
Difficulty drinking	160(76.9)	14(6.7)	24(11.5)	8(3.9)	1(0.5)	1(0.5)
Difficulty eating	87(41.8)	7(3.4)	87(41.8)	24(11.5)	3(1.4)	0(0.0)
Difficulty pronouncing words	185(88.9)	4(1.9)	12(5.8)	4(1.9)	2(1.0)	1(0.5)
Missed preschool/ school	104(50.0)	18(8.7)	78(37.5)	7(3.4)	1(0.5)	0(0.0)
Trouble sleeping	129(62.0)	9(4.3)	53(25.5)	17(8.2)	0(0.0)	0(0.0)
Irritable or frustrated	123(59.1)	8(3.9)	67(32.2)	9(4.3)	1(0.5)	0(0.0)
Avoided smiling or laughing	186(90.6)	4(1.9)	15(7.2)	3(1.4)	0(0.0)	0(0.0)
Avoided talking	190(91.4)	3(1.4)	11(5.3)	3(1.4)	0(0.0)	1(0.5)
Family Impacts						
Been upset	106(51.0)	12(5.8)	53(25.5)	32(15.4)	5(2.4)	0(0.0)
Felt guilty	112(53.8)	8(3.8)	55(26.4)	27(13.0)	6(2.9)	0(0.0)
Time off from work	78(37.5)	31(14.9)	90(43.3)	7(3.4)	2(1.0)	0(0.0)
Financial impact	139(66.8)	20(9.6)	41(19.7)	7(3.4)	1(0.5)	0(0.0)

Table 4: Mean ECOHIS domains, pre-and post-treatment and effect size

ECOHIS domains	Pre-treatment	Two weeks post-treatment	Mean difference	Standard deviation difference	Standard error difference	Effect size	t statistics	P**
Child Impact Section								
Child symptom	1.79	0.16	1.63	1.25	0.08	1.30	18.77	0.001
Child function	2.94	0.31	2.63	2.51	0.17	1.00	14.37	0.001
Child psychology	1.63	0.05	1.58	1.86	0.13	0.81	11.67	0.001
Self-image/social interaction	0.38	0.03	0.35	1.03	0.13	0.34	4.86	0.01
Family Impact Section								
Family distress	2.21	0.20	2.01	2.18	0.15	0.91	13.13	0.001
Family function	1.76	0.91	0.85	1.91	0.13	0.37	5.41	0.001

DISCUSSION

The age group of the children in this study varied between three and five years. Nearly half of the participants in this study were in the five - year-old group. They were the oldest and therefore more likely to have more dental problems than the younger groups as they have had teeth in their mouth for a longer time. Secondly they are in the stage of life when they learn self -help -skills and may probably desire to perform their oral healthcare by themselves and would not do it correctly resulting in certain oral conditions such as dental caries and gingivitis. Thirdly, among the age group studied, the five-year-olds may be left unsupervised during certain daily activities compared to the younger age groups with the notion that they can take care of themselves and this could result in dental trauma. Moreover the children in this age group had more problems with exfoliation and eruption because they are closer to the transition time to permanent dentition than the other age groups.

Over 50% of the numerous diagnosed oral conditions were dental caries and its sequelae. This agrees with reports that dental caries is still one of the most prevalent chronic childhood diseases remaining a major problem both for the child and the parents/caregivers.¹⁵⁻¹⁷

In this study, the most frequent impact in the child impact section were "pain in the teeth, mouth or jaw", "difficulty in eating" and "irritation or frustration" and it is similar to reports of other studies.^{4,6,7} In the family impact section, the most frequently reported impacts were "feeling guilty" and "feeling upset" and these are similar to reports of other studies.^{4,6,18} Oral health related conditions in young children negatively affect their quality of life for example severe dental caries causes pain, discomfort, acute and chronic infections¹⁹, gingival swellings and bleeding also cause impact on children's quality of life.²⁰ Cortes et al²¹ also reported that children with untreated dental fracture had more negative impacts on their daily living than children without any traumatic injury. Aldrigui et al² using ECOHIS showed that complicated dental injuries have negative impact on the oral health related quality of life of preschool children and their parents. In Nigeria, a study²² involving older school children also reported that untreated dental problems had some negative impact on their quality of life.

In this study, 188 (90.4%) parents reported one form of impact on the quality of life of their children following at least one oral condition. Acute herpetic gingivostomatitis and dento-alveolar abscess had the greatest impact while early dental caries and chronic marginal gingivitis

had the least impact on the quality of life of the participants (the greater the ECOHIS score, the worse the

quality of life) (Figure 1). This is probably because acute herpetic gingivostomatitis presents with painful ulcers, which affects the gingiva and other parts of the oral mucous membrane. It also presents with restlessness, drooling of saliva and difficulty in chewing and swallowing thereby affecting the quality of life of the child as well as that of the parents/caregiver. On the other hand, dentoalveolar abscess is very discomforting, making chewing difficult. Moreover, the facial asymmetry associated with dentoalveolar abscess is unaesthetic and attracts questions and comments from friends and relations both for the child and the parents/caregiver.

In the dental trauma group, luxation injuries had greater impact than tooth fractures. This is similar to the report of a study²³ which showed that cases of avulsion and /luxation were predictors of a negative impact on the OHRQoL of preschool aged children and their families. This is probably because luxation injuries are injuries to the periodontal tissue, which cause some degree of tooth loosening and may involve displacement of teeth in any direction. It is therefore associated with great discomfort for children during oral activities like eating and talking.

The sequelae of dental caries had greater impact on the participants than early carious lesions (Fig 1). Most of the children that presented with apical periodontitis and dentoalveolar abscess missed schools, had sleepless nights and had pains more often than those that had only early carious lesions. Therefore parents/caregivers are advised to take their children early to the dental health worker for an intervention once a child complains of a dental problem or when an oral condition is observed in their children's oral cavity.

Findings also revealed that oral health conditions had impacts also on the daily activities of the parents with the most prevalent item being 'feeling upset' or 'feeling guilty' and this is similar to the reports of other studies.^{4,6,7,24} Most of the parents felt upset, took time off work because of their children's dental condition resulting in lost work days while some had feelings of guilt because of their children's oral conditions.

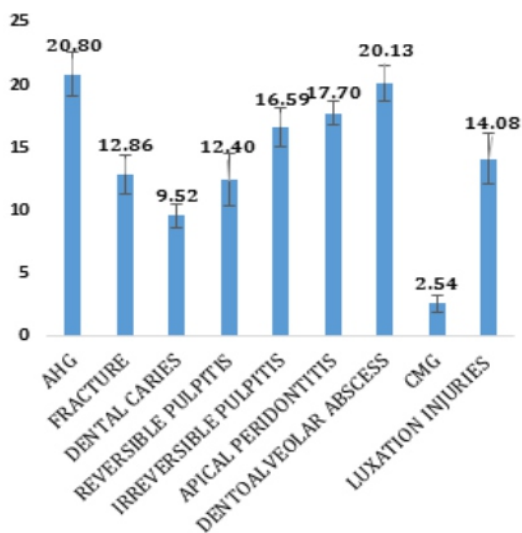


Figure 1: Comparison of the impact of the different oral conditions using their mean ECOHIS score

The reports of this study revealed that the children's functional abilities were more affected by their dental conditions than were their self-image/social interaction while in the Family Impact section, the parents/caregivers were more distressed than they did function, and it is similar to other studies^{4,6,7}

The mean difference between ECOHIS score at the pre-intervention stage and two weeks after intervention was highly significant resulting in changes in all the domains of ECOHIS. This indicates that a clear improvement follows shortly after the removal of an impact by intervention.

On the other hand, the mean difference between the two weeks post-intervention and four weeks post-intervention was very minimal (mean difference = 1.6) and therefore suggest that though there was an improvement in the quality of life at two weeks, there was also further improvement with a sustained change over a period of four weeks. These findings show that dental treatment of young children is associated with considerable improvement in their parent- reported oral health related quality of life (OHRQoL) and is similar to the findings of previous studies^{13,25} where dental interventions were instituted under general anaesthesia using other OHRQoL instruments. It therefore implies that OHRQoL of young children improves when appropriate dental treatment is offered and not necessarily only when intervention was provided under general anaesthesia.

The findings of this study also demonstrated that children's pain symptoms were better improved

than their functional abilities and in the family domain, there was a better improvement in the parental distress domain than in the parental function domain.

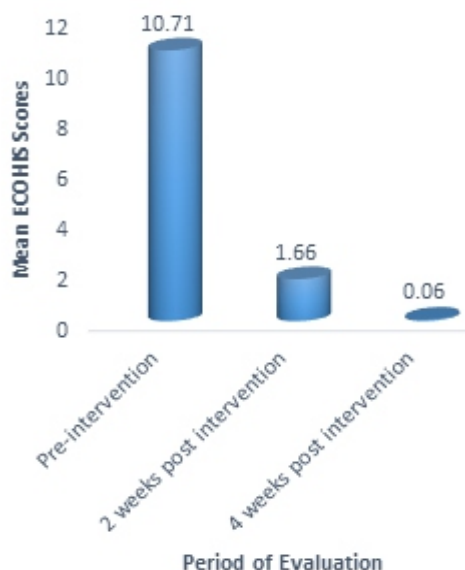


Figure 2: Comparison of mean ECOHIS scores before and after intervention

CONCLUSION

Acute herpetic gingivostomatitis and chronic marginal gingivitis had the greatest and least negative impact respectively on the oral health related quality of life of the children and their parents/caregivers. Sequelae of dental caries had more impact than early carious lesions. There was a significant improvement in the oral health related quality of life of the children and their parents/caregiver after dental intervention evidenced by a score reduction in both sections of ECOHIS post treatment.

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